wherein

i) said polynucleotide function enhancer is a compound having one of the following formulae:

$$Ar - R^1 - O - R^2 - R^3$$

or

$$Ar - N - R^1 - R^2 - R^3$$

or

$$R^4 - N - R^5 - R^6$$

or

$$R^4 - O - R^1 - - R^7$$

wherein:

Ar is benzene, *p*-aminobenzene, *m*-aminobenzene, *o*-aminobenzene, substituted benzene, substituted *p*-aminobenzene, substituted *m*-aminobenzene, substituted *o*-aminobenzene, wherein the amino group in the aminobenzene compounds can be amino, C_1-C_5 alkylamine, C_1-C_5, C_1-C_5 dialkylamine and substitutions in substituted compounds are halogen, C_1-C_5 alkyl and C_1-C_5 alkoxy;

R^1 is C=O;

R^2 is C_1-C_{10} alkyl including branched alkyls;

R^3 is hydrogen, amine, C_1-C_5 alkylamine, C_1-C_5, C_1-C_5 dialkylamine;

$R^2 + R^3$ can form a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic

amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle;

R^4 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle;

R^5 is C=NH;

R^6 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle; and,

R^7 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle; and

ii) said DNA sequence operatively linked to regulatory sequences which control the expression of said DNA sequence.

59 (New). The pharmaceutical composition of claim 58 wherein said DNA molecule is a plasmid.

60 (New). The pharmaceutical composition of claim 58 wherein said DNA sequence encodes a variable region of a T cell receptor.

61 (New). The pharmaceutical composition of claim 58 wherein said DNA sequence encodes a pathogen antigen.

62 (New). The pharmaceutical composition of claim 61 wherein said DNA sequence encodes an antigen from an intracellular pathogen.

63 (New). The pharmaceutical composition of claim 62 wherein said antigen is a viral antigen.

64 (New). The pharmaceutical composition of claim 63 wherein said pathogen is a virus selected from the group consisting of: human immunodeficiency virus, HIV; human T cell leukemia virus, HTLV; influenza virus; hepatitis A virus; hepatitis B virus; hepatitis C virus; human papilloma virus, HPV; Herpes simplex 1 virus, HSV1; Herpes simplex 2 virus, HSV2; Cytomegalovirus, CMV; Epstein-Barr virus, EBR; rhinovirus; and, coronavirus.

65 (New). The pharmaceutical composition of claim 58 wherein said DNA sequence encodes a hyperproliferative disease associated protein.

66 (New). The pharmaceutical composition of claim 65 wherein said hyperproliferative disease is cancer.

67 (New). A method of immunizing an individual comprising the steps of:

injecting into tissue of said individual at a site on said individual's body, a DNA molecule and a polynucleotide function enhancer,

said DNA molecule comprising a DNA sequence that encodes an antigen, said DNA sequence operatively linked to regulatory sequences which control the expression of said DNA sequence,

said polynucleotide function enhancer is a compound having one of the following formulae:

$$Ar - R^1 - O - R^2 - R^3$$

or

$$Ar - N - R^1 - R^2 - R^3$$

or

$$R^4 - N - R^5 - R^6$$

or

$$R^4 - O - R^1 - - R^7$$

wherein:

Ar is benzene, *p*-aminobenzene, *m*-aminobenzene, *o*-aminobenzene, substituted benzene,

substituted *p*-aminobenzene, substituted *m*-aminobenzene, substituted *o*-aminobenzene, wherein the amino group in the aminobenzene compounds can be amino, C_1-C_5 alkylamine, C_1-C_5, C_1-C_5 dialkylamine and substitutions in substituted compounds are halogen, C_1-C_5 alkyl and C_1-C_5 alkoxy;

R^1 is C=O;

R^2 is C_1-C_{10} alkyl including branched alkyls;

R^3 is hydrogen, amine, C_1-C_5 alkylamine, C_1-C_5, C_1-C_5 dialkylamine;

$R^2 + R^3$ can form a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle;

R^4 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle;

R^5 is C=NH;

R^6 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle; and,

R^7 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a

cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle; and;

wherein said DNA molecule is taken up by cells in said tissue, said DNA sequence is expressed in said cells and an immune response is generated against said antigen.

68 (New). The method of claim 67 wherein said DNA molecule is a plasmid.

69 (New). The method of claim 67 wherein said tissue includes skin and muscle.

70 (New). The method of claim 67 wherein said tissue is skin.

71 (New). The method of claim 67 wherein said tissue is muscle.

72 (New). The method of claim 71 wherein said tissue is skeletal muscle.

73 (New). The method of claim 67 wherein said immune response generated against said antigen is an immune response against a pathogen antigen.

74 (New). The method of claim 73 wherein said pathogen is an intracellular pathogen.

75 (New). The method of claim 74 wherein said intracellular pathogen is a virus.

76 (New). The method of claim 75 wherein said pathogen is a virus selected from the group consisting of: human immunodeficiency virus, HIV; human T cell leukemia virus, HTLV; influenza virus; hepatitis a virus; hepatitis B virus; hepatitis C virus; human papilloma virus, HPV; Herpes simplex 1 virus, HSV1; Herpes simplex 2 virus, HSV2; Cytomegalovirus, CMV; Epstein-Barr virus, EBR; rhinovirus; and, coronavirus.

77 (New). The method of claim 73 wherein said individual is not infected with said pathogen and said immune response generated against said antigen is a protective immune response immune response.

78 (New). The method of claim 77 wherein said DNA molecule is a plasmid.

79 (New). The method of claim 77 wherein said tissue includes skin and muscle.

80 (New). The method of claim 77 wherein said tissue is skin.

81 (New). The method of claim 77 wherein said tissue is muscle.

82 (New). The method of claim 81 wherein said tissue is skeletal muscle.

83 (New). The method of claim 77 wherein said immune response generated against said antigen is an immune response against a pathogen antigen.

84 (New). The method of claim 77 wherein said pathogen is an intracellular pathogen.

85 (New). The method of claim 84 wherein said intracellular pathogen is a virus.

86 (New). The method of claim 85 wherein said pathogen is a virus selected from the group consisting of: human immunodeficiency virus, HIV; human T cell leukemia virus, HTLV; influenza virus; hepatitis a virus; hepatitis B virus; hepatitis C virus; human papilloma virus, HPV; Herpes simplex 1 virus, HSV1; Herpes simplex 2 virus, HSV2; Cytomegalovirus, CMV; Epstein-Barr virus, EBR; rhinovirus; and, coronavirus.

87 (New). The method of claim 73 wherein said individual is infected with said pathogen and said immune response generated against said antigen is a therapeutic immune response.

88 (New). The method of claim 87 wherein said DNA molecule is a plasmid.

89 (New). The method of claim 87 wherein said tissue includes skin and muscle.

90 (New). The method of claim 87 wherein said tissue is skin.

91 (New). The method of claim 87 wherein said tissue is muscle.

92 (New). The method of claim 91 wherein said tissue is skeletal muscle.

93 (New). The method of claim 87 wherein said immune response generated against said antigen is an immune response against a pathogen antigen.

94 (New). The method of claim 87 wherein said pathogen is an intracellular pathogen.

95 (New). The method of claim 94 wherein said intracellular pathogen is a virus.

96 (New). The method of claim 95 wherein said pathogen is a virus selected from the group consisting of: human immunodeficiency virus, HIV; human T cell leukemia virus, HTLV; influenza virus; hepatitis a virus; hepatitis B virus; hepatitis C virus; human papilloma virus, HPV; Herpes simplex 1 virus, HSV1; Herpes simplex 2 virus, HSV2; Cytomegalovirus, CMV; Epstein-Barr virus, EBR; rhinovirus; and, coronavirus.

97 (New). The method of claim 67 wherein said immune response generated against said antigen is an immune response against a hyperproliferative disease-associated protein.

98 (New). The method of claim 97 wherein said DNA molecule is a plasmid.

99 (New). The method of claim 97 wherein said tissue includes skin and muscle.

100 (New). The method of claim 97 wherein said tissue is skin.

101 (New). The method of claim 97 wherein said tissue is muscle.

102 (New). The method of claim 101 wherein said tissue is skeletal muscle.

103 (New). The method of claim 97 wherein said hyperproliferative disease-associated protein is selected from the group consisting of: protein products of oncogenes myb, myc, fyn, ras, src, neu and trk; protein products of translocation gene bcr/abl; P53; variable regions of antibodies made by B cell lymphomas; and variable regions of T cell receptors of T cell lymphomas.

104 (New). The method of claim 97 wherein said immune response generated against said antigen is a therapeutically effective immune response against a hyperproliferative disease-associated protein in an individual who has a hyperproliferative disease.

105 (New). The method of claim 104 wherein said hyperproliferative disease is cancer.

106 (New). The method of claim 105 wherein said hyperproliferative disease is a melanoma.

107 (New). The method of claim 105 wherein said hyperproliferative disease is a lymphoma.

108 (New). The method of claim 67 wherein said immune response generated against said antigen is an immune response against an autoimmune disease-associated protein.

109 (New). The method of claim 108 wherein said DNA molecule is a plasmid.

110 (New). The method of claim 108 wherein said tissue includes skin and muscle.

111 (New). The method of claim 108 wherein said tissue is skin.

112 (New). The method of claim 108 wherein said tissue is muscle.

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113 (New). The method of claim 112 wherein said tissue is skeletal muscle.

114 (New). The method of claim 108 wherein said autoimmune disease associated-protein is selected from the group consisting of: variable regions of antibodies involved in B cell mediated autoimmune disease; and variable regions of T cell receptors involved in T cell mediated autoimmune disease.

115 (New). A method of introducing DNA molecules into cells of an individual comprising the step of:

injecting into tissue of said individual at a site on said individual's body, DNA molecules and a polynucleotide function enhancer; wherein

i) said polynucleotide function enhancer is a compound having one of the following formulae:

$$Ar - R^1 - O - R^2 - R^3$$

or

$$Ar - N - R^1 - R^2 - R^3$$

or

$$R^4 - N - R^5 - R^6$$

or

$$R^4 - O - R^1 - - R^7$$

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wherein:

Ar is benzene, *p*-aminobenzene, *m*-aminobenzene, *o*-aminobenzene, substituted benzene, substituted *p*-aminobenzene, substituted *m*-aminobenzene, substituted *o*-aminobenzene, wherein the amino group in the aminobenzene compounds can be amino, C_1-C_5 alkylamine, C_1-C_5, C_1-C_5 dialkylamine and substitutions in substituted compounds are halogen, C_1-C_5 alkyl and C_1-C_5 alkoxy;

R^1 is C=O;

R^2 is C_1-C_{10} alkyl including branched alkyls;

R^3 is hydrogen, amine, C_1-C_5 alkylamine, C_1-C_5, C_1-C_5 dialkylamine;

$R^2 + R^3$ can form a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle;

R^4 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle;

R^5 is C=NH;

R^6 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl

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N-substituted heterocycle; and,

R^7 is Ar, R^2 or C_1-C_5 alkoxy, a cyclic alkyl, a C_1-C_{10} alkyl substituted cyclic alkyl, a cyclic aliphatic amine, a C_1-C_{10} alkyl substituted cyclic aliphatic amine, a heterocycle, a C_1-C_{10} alkyl substituted heterocycle and a C_1-C_{10} alkoxy substituted heterocycle including a C_1-C_{10} alkyl N-substituted heterocycle; and

ii) said DNA molecules are taken up by cells in said tissue.

116 (New). The method of claim 115 wherein said DNA molecule comprises a DNA sequence that encodes a protein, said DNA sequence operatively linked to regulatory sequences which control the expression of said DNA sequence.

117 (New). The method of claim 115 wherein said DNA molecule is a plasmid.

118 (New). The method of claim 115 wherein said tissue includes skin and muscle.

119 (New). The method of claim 115 wherein said tissue is skin.

120 (New). The method of claim 115 wherein said tissue is muscle.

121 (New). The method of claim 120 wherein said tissue is skeletal muscle.